CLAIMS

What is claimed is:

1    1.    A method comprising:

2    selecting a set of one or more original ordered sequences the set of ordered

3    sequences having at least one desired property;

4    creating a set of extended sequences, each based on an original ordered sequence

5    by beginning with an element of an original sequence, cyclically appending elements of

6    the original sequence in order to obtain a desired extended sequence length, and

7    modifying each extended sequence using a corresponding modifying sequence,

8    such that a training sequence can be generated from any one of the modified

9    extended sequences by beginning with any one element of any one modified extended

10    sequence and taking each element of the any one sequence in order to obtain the training

11    sequence, the modifying sequence being selected so that the obtained training sequence

12    when modulated by a selected modulation format has the at least one desired property of

13    the corresponding original ordered sequence.

1    2.    The method of claim 1 wherein the desired extended sequence length is

2    the length of the training sequence plus the number of the element of the modified

3    extended sequence where the generation of the training sequence begins.

1    3.    The method of claim 1, wherein the one desired property comprises a

2    function of the autocorrelation of any original sequence in the set of original sequences

3    being below a threshold value.

1    4.    The method of claim 1 wherein the original ordered sequences have a

2    cross-correlation property further comprising generating further training sequences from

3    the any one sequence by beginning with other elements of the any one sequence and

4    wherein the modifying sequence is selected so that the training sequence and the further

5    training sequences when modulated by the selected modulation format have the cross-

6    correlation property.

1        5.    The method of claim 1, wherein the one desired property comprises a

2    function of the cross-correlation of any original sequence in the set of original sequences

3    with any other original sequence in the set of original training sequences being below a

4    threshold value.

1        6.    The method of claim 1, wherein the original sequence comprises a

2    sequence of complex numbers corresponding to phase shifts employed by a modulation

3    format used to transmit a training sequence.

1        7.    The method of claim 1, wherein the modifying sequence comprises a

2    sequence of complex numbers, and forming a modified extended sequence comprises

3    multiplying each element of the extended sequence by a corresponding element of the

4    modifying sequence.

1        8.    The method of claim 7, wherein the modulation format is a $\pi/M$ – MPSK

2    modulation format.

1        9.    The method of claim 8, wherein the modifying sequence comprises pairs

2    of equal complex numbers, such that each complex number pair is equal to the previous

3    complex number pair multiplied by $\exp(j2\pi/M)$.

1    10.    The method of claim 1, wherein the modulation format is a $\pi/2 - 2PSK$

2    modulation format.

1    11.    The method of claim 10, wherein the original sequence comprises a

2    sequence of binary symbols.

1    12.    The method of claim 11, wherein the modifying sequence performs a

2    binary complement operation on every other pair of elements of the extended sequence.

1    13.    The method of claim 1, wherein selecting a set of original ordered

2    sequences comprises selecting a family of Gold sequences.

1    14.    An apparatus comprising:

2    a data store having stored therein a plurality of ordered sequences for use in generating

3    training sequences, wherein a training sequence is generated by taking a number of

4    elements of one of the plurality of ordered sequences in order, wherein the training

5    sequence has at least one desired property when used by a peak to average power

6    constrained modulation format.

1    15.    The apparatus of claim 14, wherein the one desired property comprises a

2    function of the autocorrelation of a training sequence being below a threshold value.

1    16.    The apparatus of claim 14, wherein the one desired property comprises a

2    function of the cross correlation of a training sequence with any other training sequence

3    being below a threshold value.

1        17.    The apparatus of claim 14, wherein the length of the plurality of ordered

2    sequences is the length of the training sequence plus the index of the element of one of

3    the plurality of training sequences which is the initial element of the training sequence.